2877

Docket No. 239567US2S

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF:	Kentaro NAKAJIMA		
SERIAL NO:	10/606,733	GAU:	2877
FILED:	June 27, 2003	EXAMINER:	
FOR:	MRAM HAVING SAL LAYER		

INFORMATION DISCLOSURE STATEMENT UNDER 37 CFR 1.97

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:
Applicant(s) wish to disclose the following information.

REFERENCES

☐ The applicant(s) wish to make of record the references listed on the attached form PTO-1449. Copies of the listed references are attached, where required, as are either statements of relevancy or any readily available English translations of pertinent portions of any non-English language references.

☐ A check or credit card payment form is attached in the amount required under 37 CFR §1.17(p).

RELATED CASES

■ Attached is a list of applicant's pending application(s) or issued patent(s) which may be related to the present application. A copy of the claims and drawings of the pending application(s) is attached.

☐ A check or credit card payment form is attached in the amount required under 37 CFR §1.17(p).

CERTIFICATION

☐ Each item of information contained in this information disclosure statement was first cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement.

■ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application or, to the knowledge of the undersigned, having made reasonable inquiry, was known to any individual designated in 37 CFR §1.56(c) more than three months prior to the filing of this statement.

DEPOSIT ACCOUNT

■ Please charge any additional fees for the papers being filed herewith and for which no check or credit card payment is enclosed herewith, or credit any overpayment to deposit account number 15-0030. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.

Joseph A. Scafetta Jr.

Eckhard H. Kuesters
Registration No. 28,870

Joseph A. Scafetta, Jr.
Registration No. 26,803

Customer Number
22850
Tel. (703) 413-3000
Fax. (703) 413-2220
(OSMMN 05/03)

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LIST OF RELATED CASES

Docket Number	Serial or Patent Number	Filing or Issue Date	Inventor/ Applicant
239567US2S*	10/606,733	06/27/03	NAKAJIMA
242330US2S	10/653,976	09/04/03	NAKAJIMA

*Present Application; listed for information

EHK/sdj

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WHAT IS CLAIMED IS:

1. A magnetic memory device having a packaged magnetic memory chip, comprising:

a package structure including a magnetic memory chip; and

a magnetic guide of a high-permeability magnetic material, forming a structural member of the package structure.

2. A magnetic memory device according to claim 1, wherein the package structure includes a lead frame on which the magnetic memory chip is bonded by a die bonding agent and a resin which seals the bonded magnetic memory chip, and wherein at least one of the lead frame, the die bonding agent and the sealing resin forms the magnetic guide containing a high-permeability magnetic material.

3. A magnetic memory device according to claim 2, wherein the lead frame are made of a conductive high-permeability magnetic material.

4. A magnetic memory device according to claim 3, wherein the high-permeability magnetic material of the lead frame includes a grain-oriented electrical steel, permalloy, a permalloy alloy with elements added, a metal crystal material, a metal amorphous foil, and a ferrite material.

5. A magnetic memory device according to claim 4, wherein the metal crystal material includes sendust and

18. A magnetic memory device according to claim 15, wherein at least one of the die bonding agents which bond the adjacent magnetic memory chips and the die bonding agent which bonds the lowermost magnetic memory chip and the lead frame comprises a sheet member having a foil member of a high-permeability magnetic material held between two adhesive resin sheets.

19. A magnetic memory device according to claim 15, wherein at least one of an upper portion of the resin which covers an upper surface of the stacked magnetic memory chip and a lower portion of the resin which covers a lower surface of the stacked magnetic memory chip is mixed with a high-permeability magnetic particulate.

20. A magnetic memory device according to claim 19, wherein the high-permeability magnetic particulate includes ferrite of spinel type and ferrite of garnet type.

21. A magnetic memory device according to claim 19, wherein the high-permeability magnetic particulate includes a resin with Mn-Zn ferrite and an additive, and a resin with yttrium iron garnet and an additive.

22. A magnetic memory device according to claim 15, wherein a portion of the resin contacted by an outer lead portion of the lead frame is made of a

normal resin not containing a magnetic material, while other portion of the resin is made of resin mixed with a high-permeability magnetic material particulates.

23. A magnetic memory device according to claim 1, wherein the package structure includes a heat sink having a central portion on which the magnetic memory chip is bonded by a die bonding agent, a wiring board bonded on a peripheral portion of the heat sink, to which terminals of the magnetic memory chip are lead-out, and a resin which seals the magnetic memory chip, and wherein at least one of the heat sink, the die bonding agent and the sealing resin forms the magnetic guide containing a high-permeability magnetic material.

24. A magnetic memory device according to claim 23, wherein the heat sink comprises a heat sink body of Cu or Al, whose surface is covered with a high-permeability magnetic material film functioning as the magnetic guide.

25. A magnetic memory device according to claim 24, wherein the high-permeability magnetic material includes ferrite of spinel type and ferrite of garnet type.

26. A magnetic memory device according to claim 24, wherein the high-permeability magnetic material includes a resin with Mn-Zn ferrite and an additive, and a resin with yttrium iron garnet and an additive.

27. A magnetic memory device according to claim 1, wherein the package structure includes a base board in which leading-out wires are formed and on which the magnetic memory chip is bonded by a die bonding agent, and a resin which seals the magnetic memory chip, and wherein at least one of the base board, the die bonding agent and the sealing resin forms a magnetic guide containing a high-permeability magnetic material.

28. A magnetic memory device according to claim 27, wherein the magnetic memory chip is face-down bonded on the base board.

29. A magnetic memory device according to claim 27, wherein the base board is made of a high-permeability magnetic material and functions as the magnetic guide.

30. A magnetic memory device according to claim 27, wherein the base board is made of a material containing no magnetic particulates, and the resin is mixed with high-permeability magnetic particulates and functions as the magnetic guide.

31. A magnetic memory device according to claim 30, wherein the high-permeability magnetic material includes ferrite of spinel type and ferrite of garnet type.

32. A magnetic memory device according to claim 30, wherein the high-permeability magnetic material includes a resin with Mn-Zn ferrite and

an additive, and a resin with yttrium iron garnet and an additive.

33. A magnetic memory device according to claim 1, wherein the package structure includes a base board in which leading-out wires are formed and on a chip mounting depression of which the magnetic memory chip is bonded by a die bonding agent, and a resin which seals the magnetic memory chip, and wherein at least one of the base board, the die bonding agent and the sealing resin forms a magnetic guide containing a high-permeability magnetic material.

34. A magnetic memory device according to claim 33, wherein the base board is made of a high-permeability magnetic material and functions as the magnetic guide.

35. A magnetic memory device according to claim 33, wherein the base board is made of a material containing no magnetic particulates, and the resin is mixed with a high-permeability magnetic material and functions as the magnetic guide.

36. A magnetic memory device according to claim 35, wherein the high-permeability magnetic material includes ferrite of spinel type and ferrite of garnet type.

37. A magnetic memory device according to claim 35, wherein the high-permeability magnetic material includes a resin with Mn-Zn ferrite and

an additive, and a resin with yttrium iron garnet and an additive.

ABSTRACT OF THE DISCLOSURE

A magnetic memory device having a packaged magnetic memory chip is disclosed, which comprises a package structure including a magnetic memory chip, and a magnetic guide of a high-permeability magnetic material, forming a structural member of the package structure.

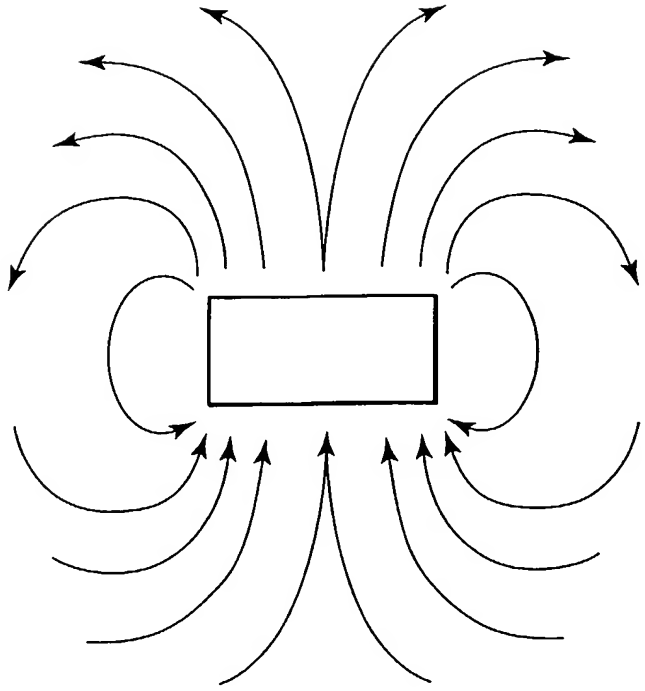

FIG. 1

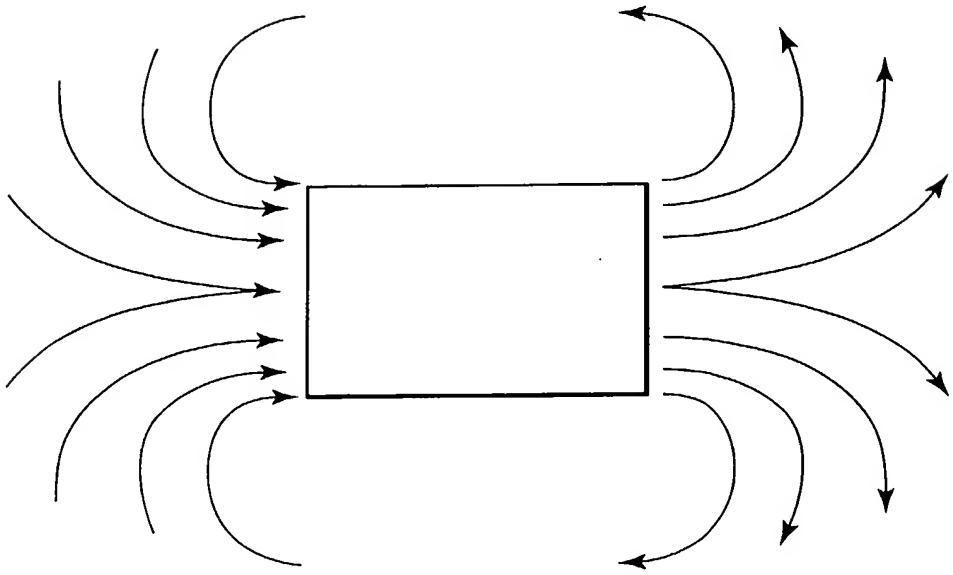

FIG. 2

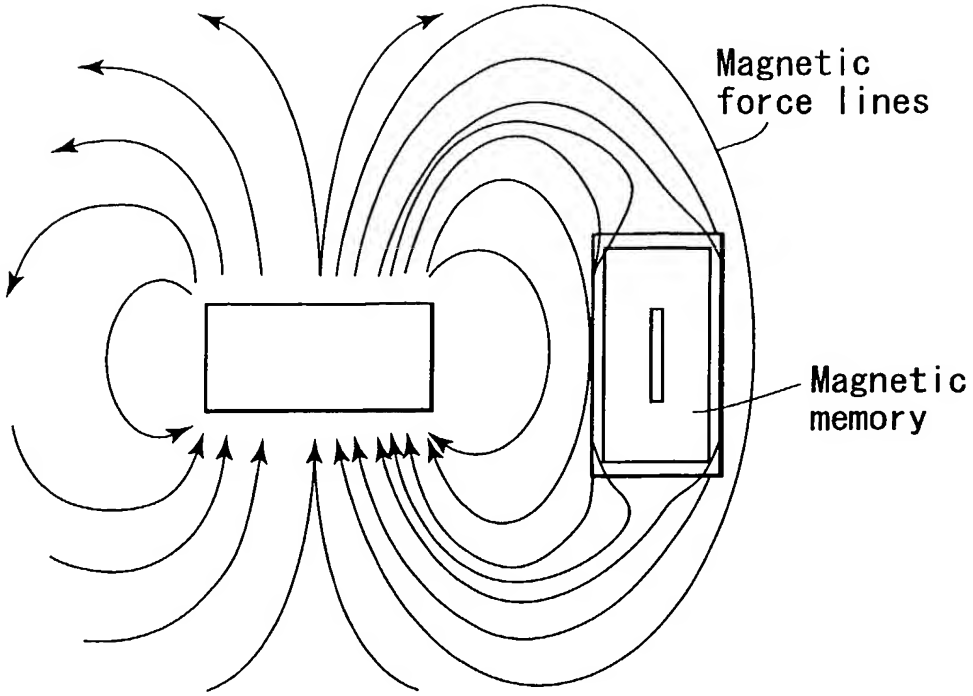

FIG. 3

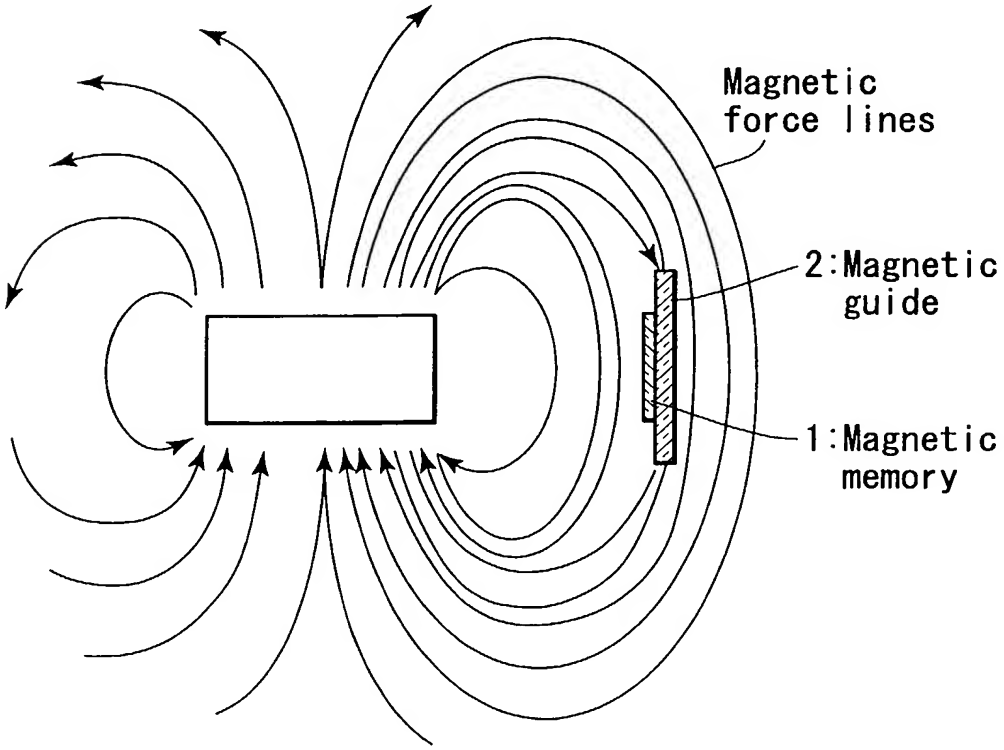

FIG. 4

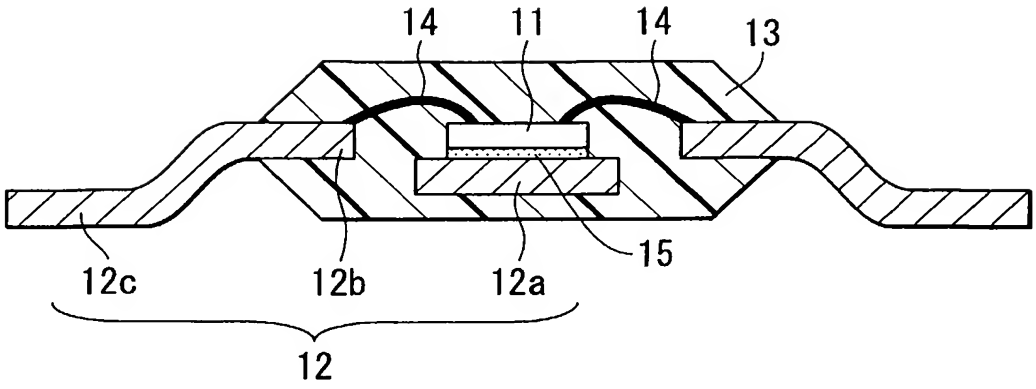

FIG. 5A

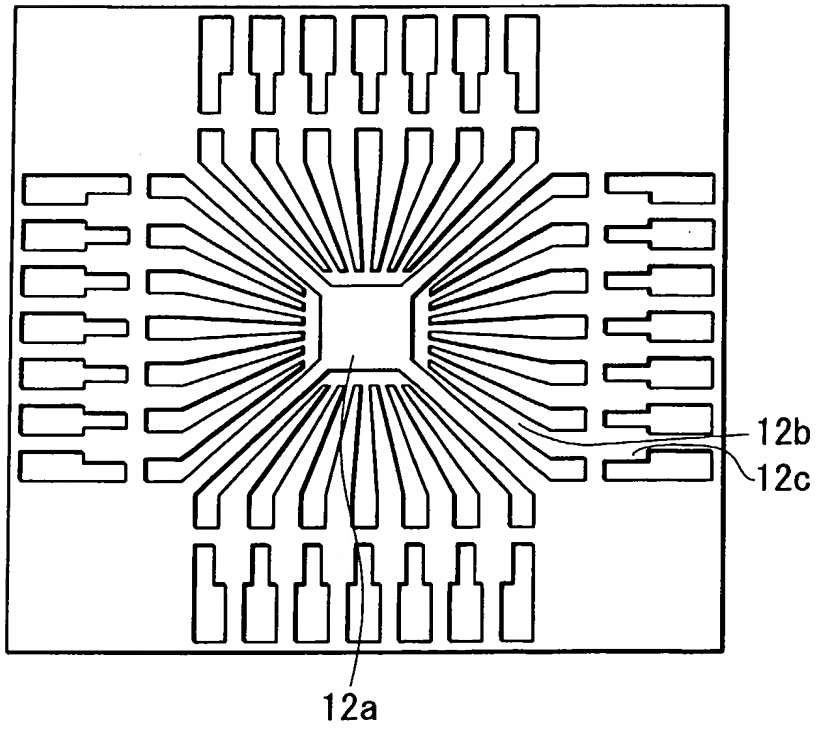

FIG. 5B

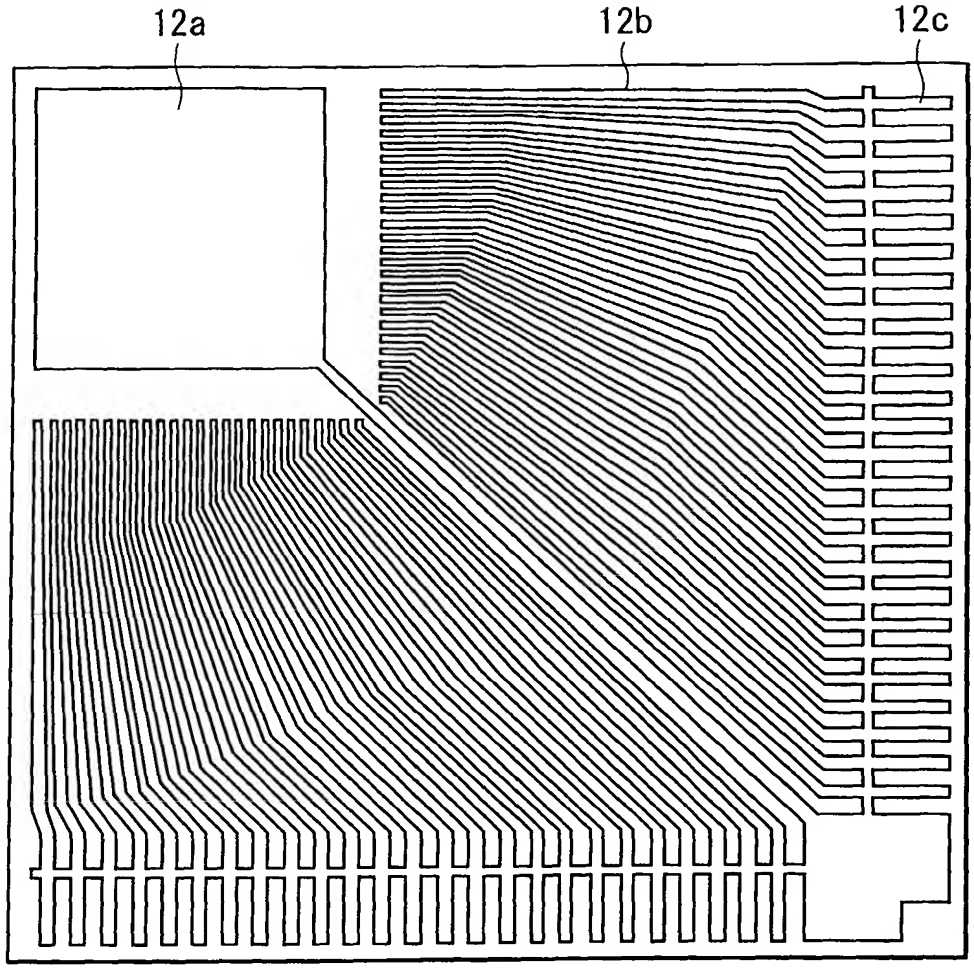

FIG. 6

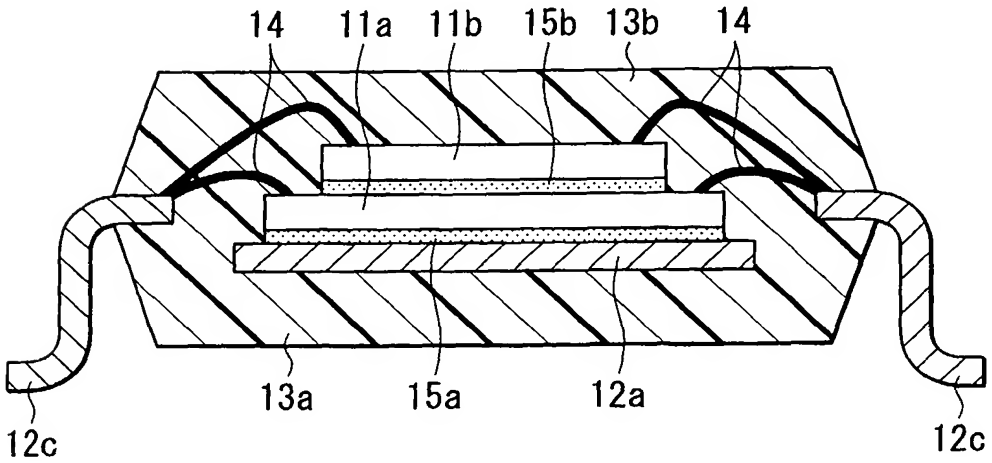

FIG. 7

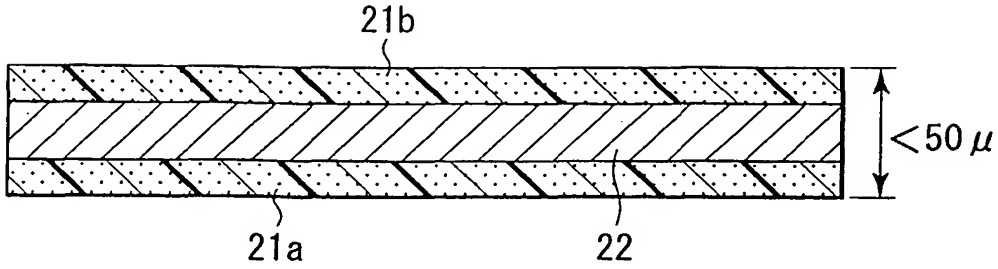

FIG. 8

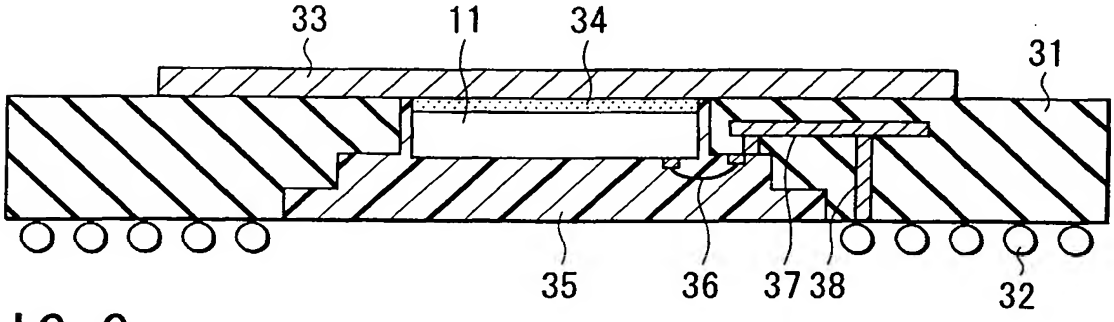

FIG. 9

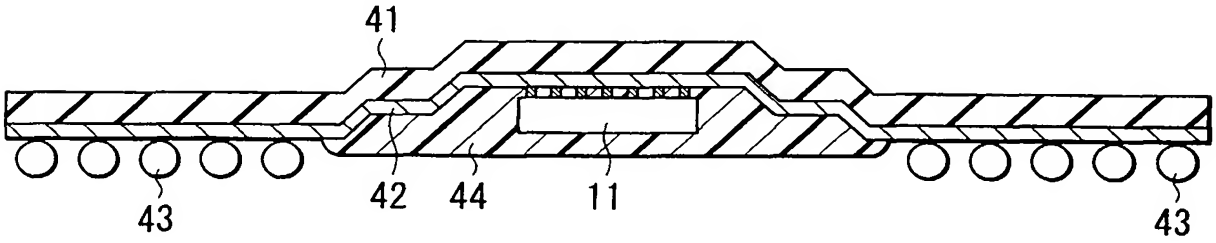

FIG. 10

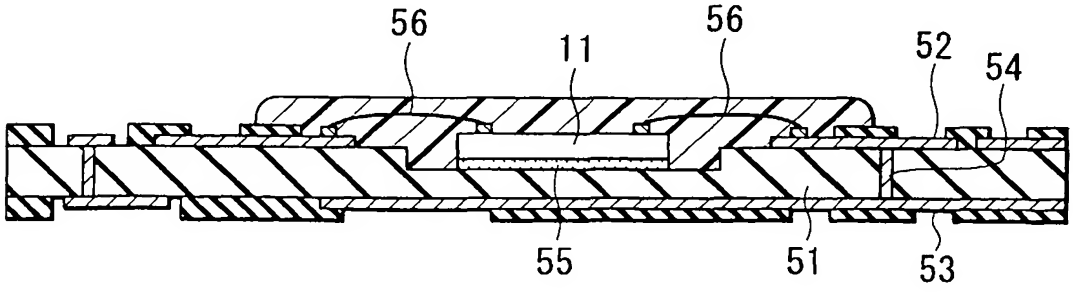

FIG. 11